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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

ESPLIN, DAVID B

ART UNIT

PAPER NUMBER

2851

DATE MAILED: 11/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/986,323

Applicant(s)

OUCHI, CHIDANE

Examiner

D. Ben Esplin

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 6) ☐ Other: _____

Art Unit: 2851

DETAILED ACTION

Claim Objections

Claim 5 is objected to because of the following informalities: Fizeau is misspelled "Fezeau". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 8 and 10 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no specific structure for an optical system operable to transform laser light into incoherent light described in the specification, or shown in the drawings.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2851

Claims 1-4, 6, 11, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,789,734 to Torigoe et al.

FIG. 1 of Torigoe et al. shows an exposure apparatus including an illumination optical system (illumination optical system 1) for illuminating a pattern of a reticle (reticle 30), a projection optical system (projection optical system 31) for projecting the illuminated pattern onto a subject (wafer 32), and an interferometer operable while using laser light outputted from the illumination optical system via an optical fiber 82. The interferometer shown by Torigoe includes a reflection member (reference flat 81) disposed on a stage (X-Y-Z stage 34) for holding the subject, and forms an interference fringe for measurement of the wavefront aberration (spherical aberration) of the projection optical system (see abstract). The apparatus shown further includes a photoelectric converter (light receiving elements 72 and 75), and an operation unit (spherical aberration measurement control 61). Torigoe also teaches that wavelength control of the illumination optical system may be used (col. 9 lines 65+).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torigoe.

Although the interferometer shown in Torigoe is not of the Fizeau variety, Applicant acknowledges that Fizeau interferometers are well known in the art (page 8 line 25 – page 9

Art Unit: 2851

line3). Therefore, it would have been obvious to one of obvious skill in the art to replace the interferometer shown in Torigoe with one of the Fizeau variety as an art recognized equivalent.

The illumination optical system of Torigoe does include an excimer laser, but does not teach of injection locking the excimer laser in order to bring its wavelength within the design value more quickly. Applicant teaches the time delay between the powering on of a laser and the point at which the wavelength of the emitted light reaches the design value is common and is solved by including a pulse emission laser for injecting laser light into the excimer laser (page 27 lines 18+). Thus it would have been obvious to use injection locking in the apparatus of Torigoe in order to overcome this lag time.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Torigoe as applied to claims 1-4, 6, 11, and 13 above, and further in view of U.S. Patent No. 6,256,087 to Bader.

The apparatus of Torigoe uses the optical fiber 82 to guide light from the illumination optical system to the interferometer, and not a semitransparent mirror. FIG. 1 of Bader shows that the use of a semitransparent mirror (deflecting mirror 5) to guide light from an illumination system of an exposure apparatus away from the exposure function for an auxiliary purpose was well known in the art. In view of the teachings of Bader, it would have been obvious to replace the optical fiber 82 of Torigoe with a semitransparent mirror, to guide light from the illumination optical system to the interferometer, as an art recognized alternative for guiding light in an exposure apparatus.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Torigoe as applied to claims 1-4, 6, 11, and 13 above, and further in view of U.S. Patent No. 5,552,892 to Nagayama.

The apparatus of Torigoe uses the optical fiber 82 to guide light from the illumination optical system to the interferometer, and not an actuated mirror. FIG. 1 of Nagayama shows that the use of an actuated mirror (mirror 33) to guide light from an illumination system of an exposure apparatus away from the exposure function for an auxiliary purpose was well known in the art. In view of the teachings of Nagayama, it would have been obvious to replace the optical fiber 82 of Torigoe with an actuated mirror, to guide light from the illumination optical system to the interferometer, as an art recognized alternative for guiding light in an exposure apparatus.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,150,173 to Isobe et al. discloses an exposure apparatus that uses an interferometer with light from an illumination source.

U.S. Patent No. 4,875,076 to Torigoe et al. discloses an exposure apparatus with an interferometer using light from an illumination optical system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. Ben Esplin whose telephone number is (703) 305-4022. The examiner can normally be reached on Mon.-Fri. (8am-4:30 pm).

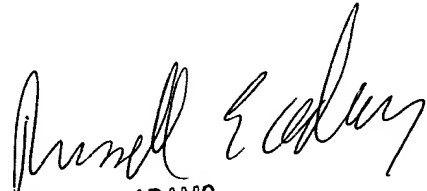
Art Unit: 2851

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russell E. Adams can be reached on (703) 308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DBE
DBE

November 7, 2002


RUSSELL ADAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800